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COVERSTORY

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Agnostic architecture

Data Storage Institute's Flexible Connected Digital Storage architecture enables users to reconfigure NAS to SAN or vice versa without having to invest in new infrastructure.

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Although the dust has yet to settle on the interoperability issues that plague the storage area network (SAN) and network attached storage (NAS) concepts, the Data Storage Institute of Singapore (DSI) has worked out a new architecture and technology that allows the conversion of NAS to SAN functionality, and vice versa.

Instead of talking about how to build NAS and SAN, the discussion should be shifted to using storage devices which allow businesses to convert NAS to SAN, and vice versa, said DSI's director Dr Chong Tow Chong.


Chong Tow Chong

DSI's Flexible Connected Digital -Storage (XDS) architecture enables users to build a storage device that can be used for various functions such as end-user data storage, server-based application storage and support for value-added services like network printing and data mining. Besides the corporate network, XDS is also capable of simultaneously hooking up a home network storage and a mobile terminal, said Chong.

Its main benefit, according to Chong, is that users are no longer limited when making long-term decisions on storage architectures.

"No one needs to implement SAN, NAS or direct attached storage and be stuck with specific functionality. They can deploy the storage solution as required, and afford to change it at a later time, with no loss of data," he added

With support for data encryption, file system recovery, RAID (redundant array of independent disks) and multi-processor support, XDS enables users to change or upgrade their storage functions while supporting different access methods -separately or simultaneously, said Patrick Khoo, programme manager at DSI.

"From the business point of view, if you deploy this technology, you can reconfigure NAS to SAN or SAN to NAS without having to invest in a new storage infrastructure," he added

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At the core of XDS are the extended small computer systems interface (eSCSI), a data protocol which is key in the conversion of NAS to SAN or SAN to NAS, and the disk arrays that can understand SAN and NAS protocols.

The difference between SAN and NAS is in the language or the protocol used, explained Khoo.

A SAN disk array "speaks" in terms of blocks of data while NAS "speaks" in terms of data in files. Because their -languages are different, the protocols for SAN and NAS are also different

"To solve this language barrier, what we have done is to build disk arrays that will understand both the SAN and NAS protocol," added Khoo.


Patrick Khoo

DSI is also developing the eSCSI data protocol, which has already been benchmarked to achieve 12Mbps on 12.5Mbps Fast Ethernet channel (with only one system on the network), with less than 1 per cent overhead for encryption, said Khoo. Work on eSCSI is expected to be completed by this year.

The performance of eSCSI is estimated to be 30 per cent faster than similar UDP/IP (user datagram protocol/Internet protocol) based storage. It is also capable of supporting SCSI, IDE (integrated drive electronics) and USB (universal serial bus) devices together with storage virtualisation.

According to Chong, eSCSI, which has already been approved by IEEE (Institute of Electrical and Electronics Engineers), supports different functionalities for wide area networks (WAN) and local area networks (LAN).

For example, within the LAN, the eSCSI protocol has a device-discovery function whereas in WAN, it is not possible to have the same functionality as there are thousands of devices within the network. Instead, the WAN eSCSI may have a point-to-point device discovery, which means the protocol searches for the location of the device rather than the device itself.

This also helps in securing the storage network.

"Data running on the LAN eSCSI cannot pass through the wide area network because eSCSI at this junction has a different functionality," said Khoo.

"And instead of having more than one interface Ð fibre channel plug and LAN plug Ð we have also developed one common interface using a Gigabit Ethernet plug. This brings more functionality at lower cost."

XDS relies on standard Ethernet and TCP/IP (transmission control protocol/Internet protocol) to serve both SAN and NAS. With the architecture already completed, just the finishing touches to add to eSCSI, and work-in-progress in the development of value-added services, DSI is ready to collaborate with various vendors and service providers to implement the technology, said Chong

The institute will be setting up a National -Network Storage Laboratory that serves as an interoperability laboratory at the same time - functions as an independent testing and benchmarking facility.

DSI is at **www.dsi.nus.edu.sg**